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CALVERT CLIFFS
NUCLEAR POWER PLANT

May 27, 2010

U.S. Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: Document Control Desk

SUBJECT: Calvert Cliffs Nuclear Power Plant
Unit No. 1; Docket No. 50-317; License No. DPR 53
Licensee Event Report 2010-001, Revision 01
Reactor Trip Due to Water Intrusion into Switchgear Protective Circuitry

The attached supplemental report is being sent to you as required by 10 CFR 50.73. Should you have questions regarding this report, please contact Mr. Douglas E. Lauver at (410) 495-5219.

Very truly yours,

Thomas E. Trepanier
Plant General Manager

TET/CAN/bjd

Attachment: As stated

cc: D. V. Pickett, NRC
S. J. Collins, NRC

Resident Inspector, NRC
S. Gray, DNR

IE22
NRR

LICENSEE EVENT REPORT (LER)

(See reverse for required number of
digits/characters for each block)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

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4. TITLE
Reactor Trip Due to Water Intrusion into Switchgear Protective Circuitry

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
02	18	2010	2010	- 001 -	01	05	27	2010		05000
									FACILITY NAME	DOCKET NUMBER
										05000

9. OPERATING MODE 1	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: (Check all that apply)									
10. POWER LEVEL 93	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)						
	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)						
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)						
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)						
	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)						
	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)						
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)						
<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> OTHER							
<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A							

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME C. A. Neyman, Senior Engineering Analyst	TELEPHONE NUMBER (Include Area Code) 410-495-3507
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13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
X	EA	64	W120	Y					

14. SUPPLEMENTAL REPORT EXPECTED

☐ YES (If yes, complete 15. EXPECTED SUBMISSION DATE)☒ NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On February 18, 2010, at 8:24 a.m., Unit 1 experienced an automatic reactor trip from 92.8 percent power. The 12B Reactor Coolant Pump (RCP) tripped and the Reactor Protective System actuated on Reactor Coolant System low flow. The 12B RCP tripped due to a phase to ground short near one of the current transformers for the 12B RCP bus 14P differential / ground current protection. The ground fault was not isolated close to the source due to a failed ground protection relay in breaker 252-2202 the feeder breaker from Service Transformer P-13000-2 to the Unit 1 RCP buses. This resulted in Service Transformer P-13000-2 being deenergized. The loss of P-13000-2 resulted in a loss of the normal power supply to 14 4 kV bus. This caused the 1B Emergency Diesel Generator to start and supply power to 14 4 kV bus.

The cause of the fault was a phase to ground short near one of the current transformers for the 12B RCP bus differential/ground current protection due to water intrusion. This event is being reported pursuant to 10 CFR 50.73(a)(2)(iv)(A) due to Reactor Protective System actuation and automatic start of the 1B Emergency Diesel Generator. Corrective actions include revision to a relay test procedure and improved management of roof issues.

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I. DESCRIPTION OF EVENT

A. PRE-EVENT PLANT CONDITIONS

Unit 1 was operating at 92.8 percent of rated thermal power on February 18, 2010, prior to the subject event.

B. EVENT

On February 18, 2010, at 8:24 a.m., Calvert Cliffs Nuclear Power Plant, Unit 1 experienced an automatic reactor trip from 92.8 percent power. The 12B Reactor Coolant Pump (RCP) tripped and the Reactor Protective System actuated on Reactor Coolant System low flow. The reactor trip circuit breakers opened as designed and all control element assemblies fully inserted as expected. Following the reactor trip, the main turbine automatically tripped. Decay heat was removed via normal methods through the turbine bypass valves to the condenser. Steam generator pressure did not reach the setpoints for opening the main steam safety valves. The steam generators remained on normal feed throughout the event. No power-operated relief valves or pressurizer safety valves lifted during the event. Containment atmosphere parameters were unaffected by the trip. Radiation levels were not affected by the trip.

A ground fault occurred in the electrical distribution system. The ground fault was not isolated close to the source due to a failed ground protection relay in breaker 252-2202, the feeder breaker from Service Transformer P-13000-2 to the Unit 1 RCP buses. This resulted in Service Transformer P-13000-2 being deenergized. The isolation of P-13000-2 was achieved in part by the isolation of the 500 kV switchyard red bus. The loss of P-13000-2 resulted in a loss of the normal power supply to 14 4 kV bus. This caused the 1B Emergency Diesel Generator (EDG) to start and supply power to 14 4 kV bus.

The loss of 14 4 kV bus also resulted in 120 volt instrument bus 1Y10 being deenergized. This resulted in the loss of letdown flow from the Chemical and Volume Control System. Prior to letdown flow restoration, pressurizer level exceeded the Technical Specification Limiting Condition for Operation (LCO) 3.4.9.a water level limit of 225 inches.

Following the reactor trip, the unit transitioned into a scheduled refueling outage.

Unit 2 experienced a reactor trip when Service Transformer P-13000-2 was deenergized. Details of that event were submitted in a separate Licensee Event Report (LER 318/2010-001).

C. INOPERABLE STRUCTURES, COMPONENTS, OR SYSTEMS THAT CONTRIBUTED TO THE EVENT

The following component was inoperable or failed at the time of the event: Breaker 252-2202.

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D. DATES AND APPROXIMATE TIMES OF MAJOR OCCURRENCES:

The reactor trip occurred on February 18, 2010 at 8:24 a.m. following the 12B RCP trip. Following the loss of 14 4 kV bus, the 1B EDG started and powered the 14 4 kV bus. At 2:08 p.m., normal power was restored to the 14 4 kV bus and the 1B EDG was secured.

Operators implemented Emergency Operating Procedure (EOP)-0, Post-Trip Immediate Actions, and performed post-trip immediate actions.

Operators implemented EOP-1, Reactor Trip, 16 minutes after the reactor trip to perform post-trip recovery actions for an uncomplicated reactor trip. Attempts to restore Chemical and Volume Control System letdown flow began 49 minutes after the reactor trip. Due to closure of the excess flow check valve, letdown was not restored until 4 hours and 51 minutes after the reactor trip.

At 12:00 p.m., while shifting steam seals from main steam to auxiliary steam, Reactor Coolant System temperature increased slightly. As a result, pressurizer level increased above the Technical Specification LCO 3.4.9.a upper limit of 225 inches for 7 minutes. This was due to the loss of Chemical and Volume Control System letdown flow following the reactor trip.

Operators transitioned from EOP-1 to Operating Procedure-5, Plant Shutdown from Hot Standby to Cold Shutdown, 5 hours and 14 minutes after the reactor trip.

On February 21 at 5:50 a.m., the 500 kV switchyard red bus was reenergized.

E. OTHER SYSTEMS OR SECONDARY FUNCTIONS AFFECTED

No other systems or functions were affected.

F. METHOD OF DISCOVERY

The event was self-revealing.

G. SAFETY SYSTEM RESPONSES

The Reactor Protective System and Emergency AC Power Supply System operated as required. There were no safety system functional failures.

II. CAUSE OF EVENT:

The event is documented in station condition report number CR-2010-001351. The 12B RCP tripped due to an electrical fault in a 13 kV system. The fault was caused by a phase to ground short circuit of one of the current transformers for the 12B RCP bus 14P differential / ground current protection. The short circuit was caused by water intrusion into the cubicle that contained the bus work and relay protective circuitry as a result of a roof leak.

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Breaker 252-2202 failed to open due to a problem with its ground fault relay. The relay's magnetizing coil had shorted out the majority of the windings and would not allow the relay's induction disc to spin. Possible failure modes for the relay are:

- Aging degradation.
- A high amount of current during the event.
- The windings may have shorted following its calibration and testing in 2008.

III. ANALYSIS OF THE EVENT:

This event resulted in valid actuations of the Reactor Protective System and the 1B EDG. The actuations were not part of a pre-planned sequence during testing or reactor operation. Therefore, this event is reportable in accordance with 10 CFR 50.73(a)(2)(iv)(A). Immediate notification of this event (Event Number 45709) was made on February 18, 2010 at 11:47 a.m. in accordance with 10 CFR 50.72(b)(2)(iv)(B) and 10 CFR 50.72(b)(3)(iv)(A).

The Nuclear Regulatory Commission Performance Indicator for Unplanned Scrams per 7,000 Critical Hours increased to 0.9 and remains green. No other performance indicators were impacted.

There were no actual nuclear safety consequences incurred from this event. An estimated conditional core damage probability of $6.3E-06$ and an estimated conditional large early release probability of $2.7E-07$ were calculated for this event.

IV. CORRECTIVE ACTIONS:

A. ACTION TAKEN TO RETURN AFFECTED SYSTEMS TO PRE-EVENT NORMAL STATUS:

Following the reactor trip, the Unit 1 transitioned into a scheduled refueling outage. Following the completion of the refueling outage, Unit 1 was restarted and paralleled to the grid on March 23, 2010.

B. ACTION TAKEN OR PLANNED TO PREVENT RECURRENCE

Repairs were performed to bus, current transformers and insulation in the 14P02 cubicle. Repairs were performed on the 45 foot switchgear room roof. The protective relay was replaced on breaker 252-2202 and proper operation was verified.

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Actions planned to prevent recurrence include:

1. Revise relay calibration procedure to perform a final as-left pickup verification to ensure the relay was not damaged during maintenance.
2. Implement improved processes for categorization, prioritization and management of roofing issues.

V. ADDITIONAL INFORMATION

A. FAILED COMPONENTS:

Breaker 252-2202 ground fault relay 2RY251G/B22-2 was manufactured by Westinghouse (EPIX Identification Number W120).

B. PREVIOUS LERs ON SIMILAR EVENTS

A review of Calvert Cliffs' events over the past several years was performed. No previous occurrences were identified involving a reactor trip due to water intrusion.